WHAT IS CLAIMED IS:

1. A medical instrument for the treatment of tissue, said medical instrument including a source of light energy; and

a connector removably attachable to said source of light energy; and an optical fiber having a proximal end, connected to said connector, and a distal end positionable at a site of the treatment, said optical fiber comprising:

a core having a distal portion and a distal face proximate said distal end of the optical fiber;

an optical coupling layer radially surrounding said distal portion of said core; and

a sleeve of unitary construction radially surrounding said optical coupling layer extending continuously and uninterrupted along the length of said optical fiber from said distal face of said core to said connector.

2. The medical instrument according to Claim 1, wherein said sleeve contacts said core at said distal portion.

3. The medical instrument according to Claim 2, wherein said sleeve forms a penetrating tip distal to said distal face of said core.

4. The medical instrument according to Claim 3, wherein said optical fiber further comprises a light-scattering component affixed to said distal face of said core.

5. A method of producing a medical instrument for the treatment of tissue, said instruments including an optical fiber having a core, a cladding and a continuous uninterrupted sleeve; said method comprising:

a) stripping said cladding from said optical fiber so as to leave a volume between the core of said optical fiber and the sleeve of said optical fiber;

b) filling said volume with a material curable into an optical coupling layer; and

c) molding a penetrating tip at a distal end of said optical fiber , while causing said sleeve to touch said core.

6. The method according to Claim 5, wherein said core includes a distal end, said method further comprising placing a light-scattering component at said distal end of said core.

7. A method according to Claim 5, wherein said core has a distal portion, further comprising:

d) placing an annulus over said distal portion of said core;

e) filling said volume with a material curable into an optical coupling layer; and

f) molding a penetrating tip at a distal end of said optical fiber while fusing said annulus to said sleeve to cause said sleeve to touch said core.

8. The method according to Claim 7, further comprising forming a light-scattering component inside said annulus.

9. An optical fiber assembly having a proximal end and a distal end, said optical fiber assembly comprising:

a) a core having a distal portion and a distal face;

b) an optical coupling layer radially surrounding said proximate said distal end of the optical fiber assembly core;

c) a connector affixed at said proximal end of said optical fiber assembly; and

d) a sleeve radially surrounding said optical coupling layer and extending continuously and uninterruptedly from said distal face of said core to said connector.

10. The optical fiber assembly according to Claim 10, wherein said sleeve contacts said core at said distal portion.

11. The optical fiber assembly according to Claim 10, wherein said sleeve forms a penetrating tip distal to the distal face to said core.

12. The optical fiber assembly according to Claim 11, comprising a light-scattering component affixed to said distal face of said core.

13. The optical fiber assembly according to Claim 9, wherein said sleeve is of a unitary, single-piece construction.

14. The method according to Claim 5, wherein said sleeve is radially compressed to cause said sleeve to touch said cove while molding said penetrating tip.